

## Lab: Isolating Copper – p. 36-37 Block

**Question:** How can pure copper be isolated from a compound by electrolysis?

### Materials:

150 ml beakers  
2 paper clips  
2 alligator clips  
1 9 volt battery  
1 index card  
0.6 M  $\text{CuCl}_2 \cdot \text{H}_2\text{O}$  solution (9.5 g/100 ml distilled  $\text{H}_2\text{O}$ )  
steel wool – to clean electrodes (paper clips)

**Procedure:** See Blocks book page 36-37 – make sure to answer the following:

6. Predict what will happen if you allow current to run 2-3 minutes.
7. Write down which electrode (+ or – has the Cu being deposited on it and which has bubbles coming off of it).
8. Try to detect an odor – describe.
9. Note if the color of the solution has changed.
10. Note the color of the tips of the electrodes (record info – remember to see if it is attached to the + or – pole of the battery).

### Analyze and Conclude:

1. Make a labeled diagram of your experimental setup. Indicate which electrode is connected to the positive side of the battery and which is connected to the negative side.
2. On which electrode was the copper produced?  
On which was the chlorine gas produced?
3. If the color of the solution changed, how can you explain this color change?
4. Compare the properties (solids, liquids, gases, other physical characteristics) of copper, chlorine and copper chloride solution.
5. Describe the changes in matter that you observed. Classify them as physical changes or chemical changes.
6. Using your observations of this procedure as evidence (and information in the book on pages 18-21), explain why you think copper chloride is a compound, and not a mixture.

### More to Explore:

Predict what would happen if you reversed (switched) the positive and negative sides of the experiment. If time allows, do it and record your observations. Was your prediction correct?

### Conclusion:

Write a paragraph that includes: a brief summation of what the experiment was about, explains why the copper and chlorine formed at the poles they did, what you learned, and the answer to the question (above).

## Lab: Isolating Copper – p. 36-37 Block – Answers to Analyze and Conclude

1. Check diagrams, make sure labels are correct.
2. Copper forms on the negative electrode, and chlorine gas bubbles at the positive electrode.
3. The color changed because of the chemical reaction.
4. Copper is a shiny, gold-colored metal.  
Chlorine is a dense, green, irritating gas  
Copper chloride solution is a clear, green liquid.
5. The dissolved copper chloride underwent a chemical change to form new substances, copper and chlorine.  
As the chemical change took place, the copper became a solid and the chlorine became a gas.
6. Copper chloride must be a compound because when electrolysis caused a chemical change by breaking its chemical bonds, two elements – copper and chlorine – were produced.